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## CHAPTER 6

### LONG-TERM IMPROVEMENTS

#### Introduction

The improvements described in this chapter are recommended for implementation between 2006 and 2030—primarily in conjunction with private redevelopment of adjacent properties.

As with the near-term improvement recommendations described in Chapter 5, the long-term improvement recommendations are also based on the results of extensive public involvement, interagency cooperation, and technical analysis. These improvements, when implemented, will enhance the function of the SR 99 North Corridor as a local and regional multi-modal transportation facility.

Prior to developing the long-term recommendations, the SR 99 North Corridor Study Steering Committee reviewed neighborhood plans and worked with neighborhood groups, the business community, and the general public to evaluate a variety of improvement options. From this evaluation, the draft improvement recommendations were selected and then revised per comments from the aforementioned parties. The final recommendations presented here are the results of this process.

With the exception of the Aurora Bridge (which would be a specific state and/or city initiated and sponsored project) all the long-term recommendations would take place over time in conjunction with private property redevelopment. As redevelopment occurs, curb lines and sidewalk edges would be set to the future cross-section location ultimately resulting in a new roadway width. The proposed future right-of-way widths that would be used to accomplish this are similar to the current right-of-way requirements used by the City of Seattle for new development (Table 6-1).

The long-term improvement recommendations are presented by study focus area and include future typical cross-sections. As noted previously, the SR 99 North study corridor has been divided into three study focus areas. The South Focus Area extends from the north end of the Battery Street Tunnel to N. 50th Street. The Central Focus Area extends from N. 50th Street to N. 110th Street. The North Focus Area extends from N. 110th Street to N. 145th Street. The study corridor was divided into these three focus areas based on unique road design characteristics and adjacent land uses.

<p align="center"><b>Table 6-1</b> <b>Proposed Right-of-Way Widths</b></p>				
<b>Section</b>	<b>Existing Right-of-way</b>	<b>Existing Curb to Curb</b>	<b>Proposed Right-of-way</b>	<b>Proposed Curb to Curb</b>
Aloha St to Halladay St	106 feet	78 feet	106 feet	78 feet
N. Halladay St to N. 38 St	100 feet	57 feet	100 feet	70 feet
N. 38 St to N. 50 St	106 feet	78 feet	106 feet	78 feet
N. 50 St to N. 59 St	106 feet	62 feet	106 feet	74 feet
N. 59 St to N. 72 St	106 feet	62 feet to 78 feet	106 feet	TBD <sup>1</sup>
N. 72 St to N. 110 St	90 feet	71 feet to 74 feet	100 feet	79 feet
N. 110th St to N. 145 St	90 feet to 108 feet	61 feet to 78 feet	102 feet	81 feet
<sup>1</sup> To be determined. Proposed curb to curb would depend on large-scale private redevelopment. (see page 71)				

## South Focus Area – Battery Street Tunnel to N. 50th Street

Recommendations for the southern section focus on existing accident and traffic operation problems in three major areas: Raye and Halladay streets, the Aurora Bridge, and Bridge Way and N. 38th Street. The HAL and PAL located in the vicinity of Denny Way are expected to be addressed by the SR 99 Alaskan Way Viaduct and Seawall Project. The SR 99 Alaskan Way Viaduct and Seawall Project is currently underway and is evaluating options to improve mobility and safety on SR 99 North south of Mercer Street.

Table 6-2 summarizes the long-term improvements proposed for the South Focus Area.

<p align="center"><b>Table 6-2</b> <b>SR 99 North South Focus Area Proposed Long-Term Improvements</b></p>	
<b>Location</b>	<b>Long-Term Improvements</b>
Aloha St. to Dexter Way	Amenity zone (sidewalk and planting strip) improvements
Halladay St. – Raye St.	Staged reconstruction of Raye and Halladay Street intersections and signalization of nearby intersections.
Aurora Bridge	Widen existing lanes, add median barrier, construct new pedestrian facilities
N. 38th St. vicinity (including Bridge Way and Fremont Way)	<p>Realign and add traffic signals to intersections between Fremont Way N. and Bridge Way N. including intersections with N. 38th St. and SR 99 North on- and off-ramps.</p> <p>Add new acceleration and deceleration lane between N. 38th and 39th streets</p>
N. 39th St. to N. 50th St.	Widen existing lanes

## *Aloha Street to Dexter Way*

In this predominantly controlled access section of the corridor, the only substantive change proposed for the existing cross-section is a wider amenity zone (sidewalk and planting strip). However, future high accident locations along this segment of the corridor may be improved if it is determined that roadway improvements would reduce accidents. These improvement upgrades could have right-of-way implications for adjacent properties. The estimated cost for the wider amenity zone along this 1.1-mile section of roadway is \$7.1 million and the improvements are shown in Figure 6-1. The cost estimate is in 2002 dollars.

## *Halladay Street Intersection*

### **Problems and Causes**

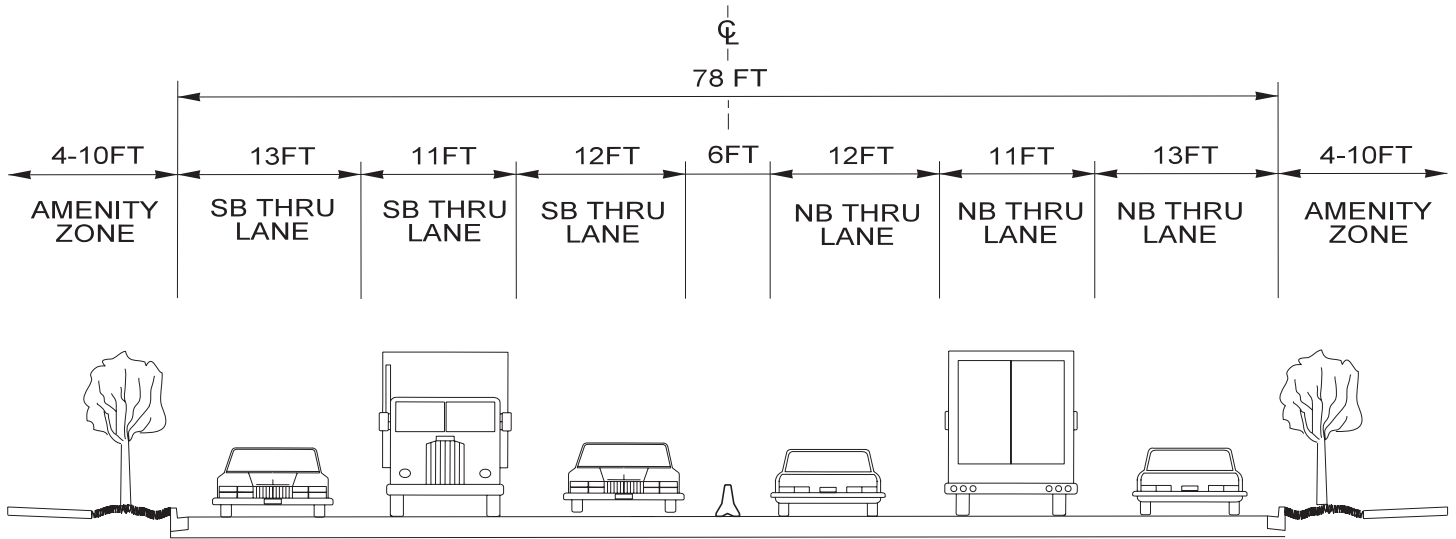
Access to and from the Queen Anne neighborhood through the Halladay Street intersection is problematic, especially in the p.m. peak period. Although the posted speed limit is 40 miles per hour, northbound SR 99 North traffic often travels in excess of 50 miles per hour approaching this intersection. Vehicles exiting SR 99 North slow and often queue in the outside through lane. This queuing takes place on a curved section of roadway, which limits sight distance. The combination of slow moving vehicles, limited sight distance with a horizontal curve, and approaching vehicles traveling at 40 miles per hour or faster creates a potentially hazardous situation. This situation has a high potential for rear-end accidents.

Vehicles entering SR 99 North northbound from Halladay Street are also a concern. Currently, vehicles have no acceleration lane at the Halladay Street entrance to SR 99 North so vehicles must directly enter the outside through lane that immediately narrows to 9.5 feet in width. This movement is also on a curve and involves high-speed traffic. This presents a high potential for rear-end and entering-at-angle accidents associated with this movement.

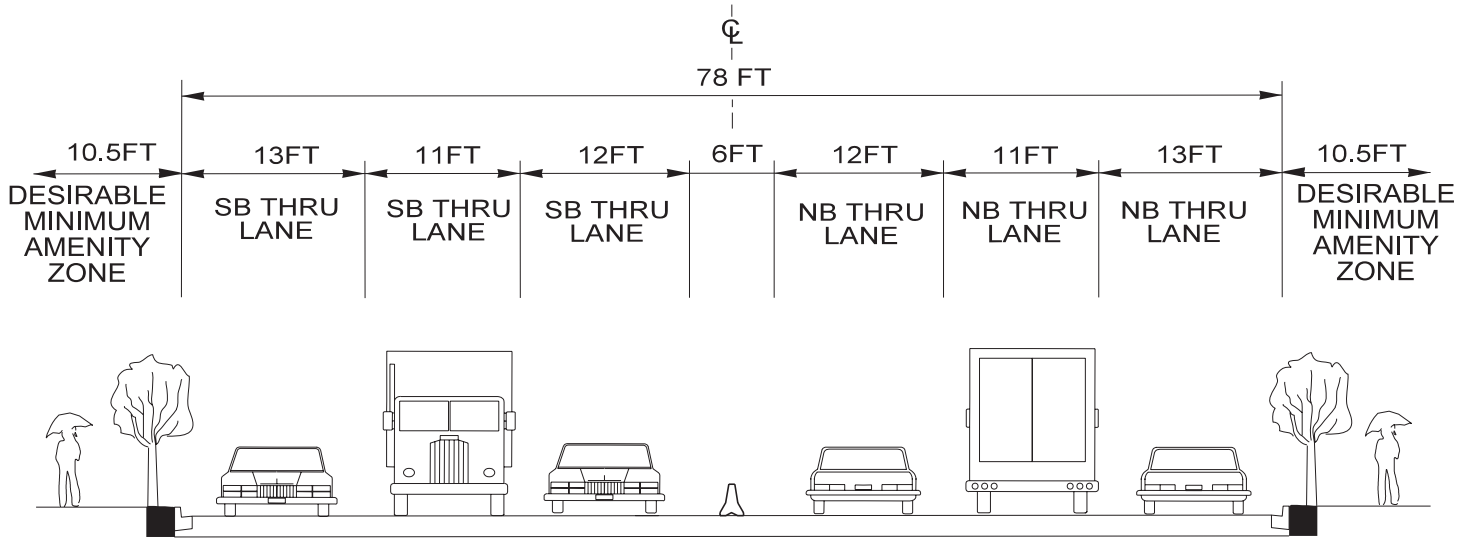


**Picture 6-1:**  
**The intersection**  
**of Halladay Street**  
**and SR 99 North**

**Figure 6-1**  
**Aloha St to Dexter Way Proposed Future Cross Section**



**EXISTING CROSS SECTION**



**PROPOSED FUTURE CROSS SECTION**

\*THE PROPOSED FUTURE CROSS SECTION WILL BEGIN AT ALOHA ST. BECAUSE DENNY WAY TO ALOHA ST. HAS MANY ADD / DROP LANES

## Options Considered

To address the accidents at Halladay Street, four alternatives were considered:

- ♦ converting the outside lane to a drop/add lane
- ♦ adding a new acceleration lane
- ♦ adding a new deceleration lane
- ♦ installing new signage

### *Conversion of the Northbound Outside Lane to a Drop/Add Lane*

The option of converting the northbound outside lane to a drop/add lane was proposed to separate exiting and entering vehicles from the northbound through traffic. This alternative would require all through traffic to merge into the left two lanes south of the Halladay intersection and remain there until a midpoint on the Aurora Bridge. With the exception of the p.m. peak period, this would create a new choke point by requiring all through traffic to operate in two lanes instead of three. The queuing associated with this conversion would create the potential for more rear-end accidents on northbound SR 99 North. This option was removed from further consideration because of the adverse impacts it would have on traffic congestion and safety.

### *Additional Northbound Acceleration Lane*

A second option was to add a northbound acceleration lane for vehicles accessing SR 99 North from Halladay Street. This modification would require additional right-of-way and necessitate constructing a new structure to connect to the Aurora Bridge. The additional right-of-way and new bridge structure are needed to provide adequate acceleration and taper distance for vehicles to merge into the outside through lane. The right-of-way required would have significant impacts on the Canlis Restaurant that has been identified as an historic building. Because of the right-of-way impacts and cost associated with a new structure, this option was not recommended.

### *Additional Northbound Deceleration Lane*

A third option was to add a new deceleration lane for turning vehicles at Halladay Street. This option would allow vehicles turning at Halladay Street to be removed from the through traffic before slowing to exit. Another benefit of this option would be the increased distance between the Canlis restaurant driveway and the Halladay Street intersection. There would be right-of-way impacts associated with this alternative as additional width on the east side of SR 99 North is necessary to add a new lane and shift Halladay Street to the south.

### *New Signage*

New road signs were also considered to address the problems in this area. Signs warning of slowing, exiting, or entering vehicles are possible, but would not likely have a dramatic impact on the accident or congestion problems in this area. This option was not considered solely sufficient to address the back-ups and accidents occurring at the Halladay exit. However, this option was considered complementary to other intersection and channelization improvement options and is included in the study's final recommendations (see Recommendations section below).

### **Recommendation**

The final improvement recommendation for this area is to add a new outside deceleration lane approaching Halladay Street and to relocate Halladay Street to the south. See Figure 6-3.

This combination of options is recommended; however, it would be a long-term solution as property redevelopment would likely be necessary to obtain the needed right-of-way.

As part of this recommendation, new signs warning of slowing, exiting, or entering vehicles to the Queen Anne Drive/Halladay Street intersection are recommended.

## ***Raye Street Intersection***

### **Problems and Causes**

The southbound Raye Street exit has a tight turning radius that causes vehicles to slow in the outside through lane approaching the intersection. In addition to this constraint, the intersection of Queen Anne Drive/4th Avenue/Raye Street has vehicle queues that back up onto SR 99 North. During the p.m. peak period, these queued vehicles can take as long as 4.5 minutes to travel from the Aurora Bridge through this intersection. In this area, the intersection of Queen Anne Drive/4th Avenue/Raye Street currently operates at LOS F in both the a.m. and p.m. peak hours.

The queued vehicles create a potential for rear-end accidents. The narrow lanes on the Aurora Bridge also create the potential for sideswipe accidents involving these queued vehicles.

The traffic entering SR 99 North southbound from Raye Street is also problematic. There is no acceleration lane for these vehicles, so they must directly enter the traffic flow from a stop. Coupled with the high volumes and speeds on SR 99 North, this creates the potential for rear-end and entering-at-angle accidents.

As noted in Chapter 3, a total of 94 accidents occurred in the 0.65-mile section of SR 99 between the Halladay and Raye Street intersections and the north end of the Aurora Bridge.



**Picture 6-2:**

**Back up on SR 99 North southbound caused by accident at Raye Street and SR 99 North**

## Options Considered

Several options were considered to address the traffic congestion and safety issues in this area including:

- ♦ adding a southbound off-ramp
- ♦ converting the outside lane to a drop and add lane
- ♦ improving signing
- ♦ installing a new traffic signal
- ♦ rerouting traffic

Similar to the Halladay Street proposal, converting the existing outside lane to a drop lane was not recommended because of the resulting queuing and accidents that would likely occur on SR 99 North

Signing improvements were considered as a stand-alone recommendation, but would likely have little impact on the traffic operations or accident experience in this area. The size and location of signs on the Aurora Bridge is restricted; as signs can only be mounted on light poles and have to be small enough not to overload the poles during windy conditions. These limitations also reduce the effectiveness of this option.

The other alternatives for the Raye street intersection were combined into a staged alternative for the final recommendation. Please see the recommendation section for a more detailed description of the staged recommendation.

## Recommendation

The recommendation for the Raye Street intersection is a staged approach incorporating multiple options listed above. The main benefit of the staged approach is that it minimizes impacts to nearby residents for as long as possible, until further improvements are needed. There is no timetable set for implementing each stage, as a reevaluation of the area would be needed after every improvement to determine its effects. The stages presented could be modified in the future to address changes in traffic patterns or the effects previous improvements have on accidents and traffic congestion in the area. The four stages of the Raye Street recommendation are:

### *Stage 1 (Figure 6-2):*

Stage 1 of the recommendation would be to improve the Queen Anne Drive/4th Avenue/Raye Street intersection. This intersection was identified as the contributing cause for much of the traffic congestion in the area and therefore would be the first hot spot to be improved. The recommendation is to add a traffic signal and reduce the number of approaches at the intersection. By closing some of the approaches to this seven-leg intersection, a traffic signal could be installed and improvements to traffic flow and queue reduction could be realized. The closed streets could still access this intersection through other routes. The City of Seattle has jurisdiction over this location and has agreed to take a detailed look at ways to implement these changes.

### *Stage 2 (Figure 6-3):*

Stage 2 of the recommendation would include the Halladay Street recommendation, and would add a signal at the Halladay Street/6th Avenue intersection. The operation of this signal will be determined by the City of Seattle, but it will need to balance the 6th Avenue traffic volumes with the northbound SR 99 North existing volumes.

### *Stage 3 (Figure 6-4):*

Stage 3 would reconstruct the Raye Street intersection with SR 99 North as well as add an acceleration/deceleration lane between the Raye Street on-ramp and the Dexter Way off-ramp. A new ramp would be constructed to allow vehicles to exit southbound SR 99 North at a greater speed, reducing the risk of rear-end accidents and improving traffic flow on SR 99 North. A new bridge, connected to the Aurora Bridge, would be built for this new off-ramp from SR 99 North. Work along Dexter Avenue North would include signalization of two intersections (with Dexter Way North and with 6th Avenue North) and some rechannelization between the intersections. The existing bicycle lane along Dexter Way would remain as it is today. Sixth Avenue N. would also be reconstructed between the Stage 2 work and the intersection with Dexter Avenue to improve the intersection alignment and to allow larger vehicles to use the intersection.



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Figure 6-3  
Queen Anne Access Stage 2

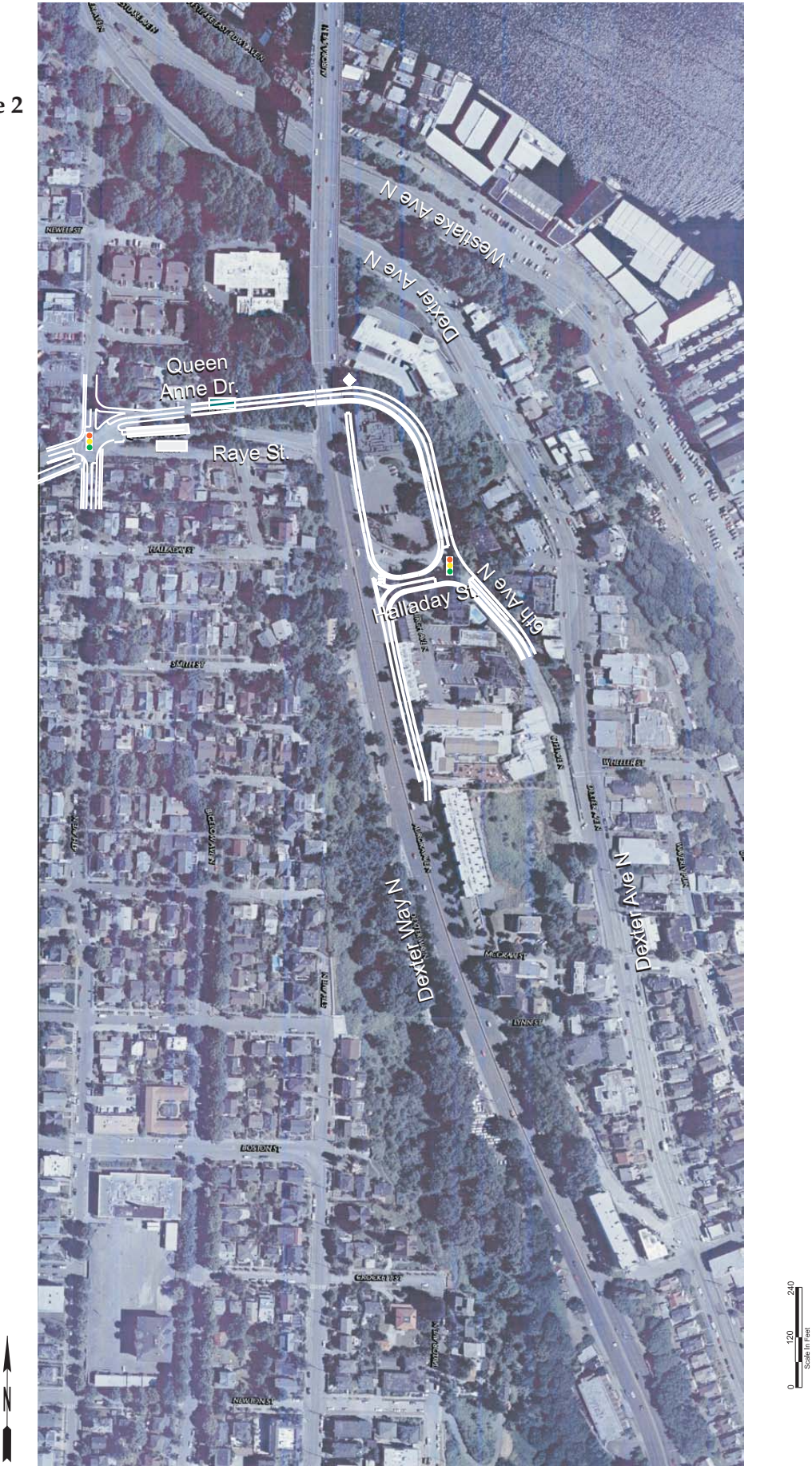




Figure 6-4  
Queen Anne Access Stage 3



SR 99 North: North End of Battery Street Tunnel to N. 145th Street  
Route Development Plan

*Stage 4 (Figure 6-5):*

Stage 4 of the recommendation would only be constructed as a last resort if the previous stages did not significantly improve traffic flow and reduce accidents in this area. This stage would remove the Raye Street off-ramp bridge constructed in Stage 3 (making Raye Street a one-way street onto SR 99 North southbound) and rerouting westbound Queen Anne traffic to the Dexter Way N. off-ramp. Queen Anne traffic would then travel on Dexter Avenue, 6th Avenue, and Queen Anne Drive to get to the Queen Anne Drive/4th Avenue/Raye Street intersection. Stage 4 would also modify the 5-legged intersection and signal built in Stage 1 to accommodate a one-way eastbound Raye Street.

The traffic signal timing at the intersection of Halladay Street and Queen Anne Drive would need to be revised with the change in traffic patterns caused by the rerouting. The timing of this signal would be determined by the City of Seattle, but would need to balance the rerouted traffic volumes with the northbound SR 99 North exiting volumes. The projected 2030 a.m. and p.m. peak LOS for this location are B and D respectively.

This new route is estimated to take 4.5 minutes to travel during the p.m. peak period and would continue to operate at this level up to year 2015. The 2030 LOS at the Queen Anne Drive/4th Avenue/Raye Street intersection would be F in both the a.m. and p.m. peak hours. This intersection will, however, would have significantly less queuing than the no-action option.

Without the improvement, the p.m. peak traffic projections show traffic would be queued across the entire length of the Aurora Bridge.

The details associated with all stages of this modification would need to be refined as they go forward as actual improvements. Specifics regarding signal operations, specific roadway geometrics, and pedestrian and bicycle facilities would be determined at that time.

The estimated cost to construct all the improvements associated with Queen Anne access is \$19.8 million. The largest cost is the construction of the new ramp at Raye Street. The cost estimate is in 2002 dollars.



Figure 6-5  
Queen Anne Access Stage 4



# *Aurora Bridge*

## **Problems and Causes**

The Aurora Bridge area has traffic congestion and is part of a High Accident Corridor (see Chapter 3: Accidents and Safety Issues). The existing Aurora Bridge has narrow lanes (9.5 feet), no median barrier, and no barrier separating the roadway and sidewalk. The lanes are so narrow that buses and other large vehicles sometimes straddle two lanes while traveling on the bridge. The combination of narrow lanes, lack of a median barrier, and driver actions (speeding, following too close, etc) creates a risk for sideswipe, rear-end and head-on traffic accidents. Over 80% of the accidents on the bridge are either sideswipe or rear-end accidents. The narrow lanes also reduce the traffic capacity of the roadway. Rear-end accidents also occur on the bridge due to congestion from the Raye Street intersection to the south and the N. 38th Street off-ramp to the north.



**Picture 6-3:  
Aurora Bridge  
Deck**

## **Options Considered**

Several options were considered to address the Aurora Bridge. The design of the existing bridge deck will not allow any additional weight loading. This limitation prohibits simply widening the lanes and sidewalks and adding barriers. An option that widened the lanes and removed the sidewalks was considered, but was not recommended because keeping a pedestrian facility was deemed necessary. A new bridge was estimated to cost approximately \$200 million and was therefore excluded from further discussion as a part of this study.

## **Recommendation**

The proposed bridge improvement (Figure 6-6) would widen the lanes from 9.5 feet to 11.5 feet for the curb and inside lane and 11 feet the middle lane. A median barrier would be added to the bridge and approaches, and would connect to the existing barriers at the N. 38th Street and the Halladay Street intersections. The proposed



additional lane widths and median barrier would require relocating the sidewalks below the bridge deck. In addition, the sidewalks would be widened to 10 feet to provide for multiple users and non-motorized vehicles. The ramps connecting the existing and proposed sidewalks would meet ADA guidelines and strive to preserve bicycle and pedestrian access to neighborhoods on both the north and south ends of the Aurora Bridge. Additional safety and security measures, such as escape ladders and security cameras are also recommended. Security improvement details would be addressed in the design process. This bridge improvement recommendation is conceptual and still requires further engineering.

The estimated cost to complete these improvements is \$29 million. The cost estimate is in 2002 dollars.

## ***N. 38th Street Vicinity***

### **Problems and Causes**

Both Bridge Way N. and N. 38th Street have operational and access issues. Currently, the off-ramp intersections are unsignalized and have several conflicting movements. The northbound off-ramp onto Bridge Way N. often has traffic queues back onto the Aurora Bridge in the p.m. peak period. Access from this area to northbound SR 99 North is very problematic for large vehicles. Access to northbound SR 99 North in this area is via N. 38th Street; however, the tight turning radius restricts trucks and large vehicles from using this location. As a result, trucks detour onto Stone Way through the Green Lake Park and access northbound SR 99 North at Green Lake Way North.

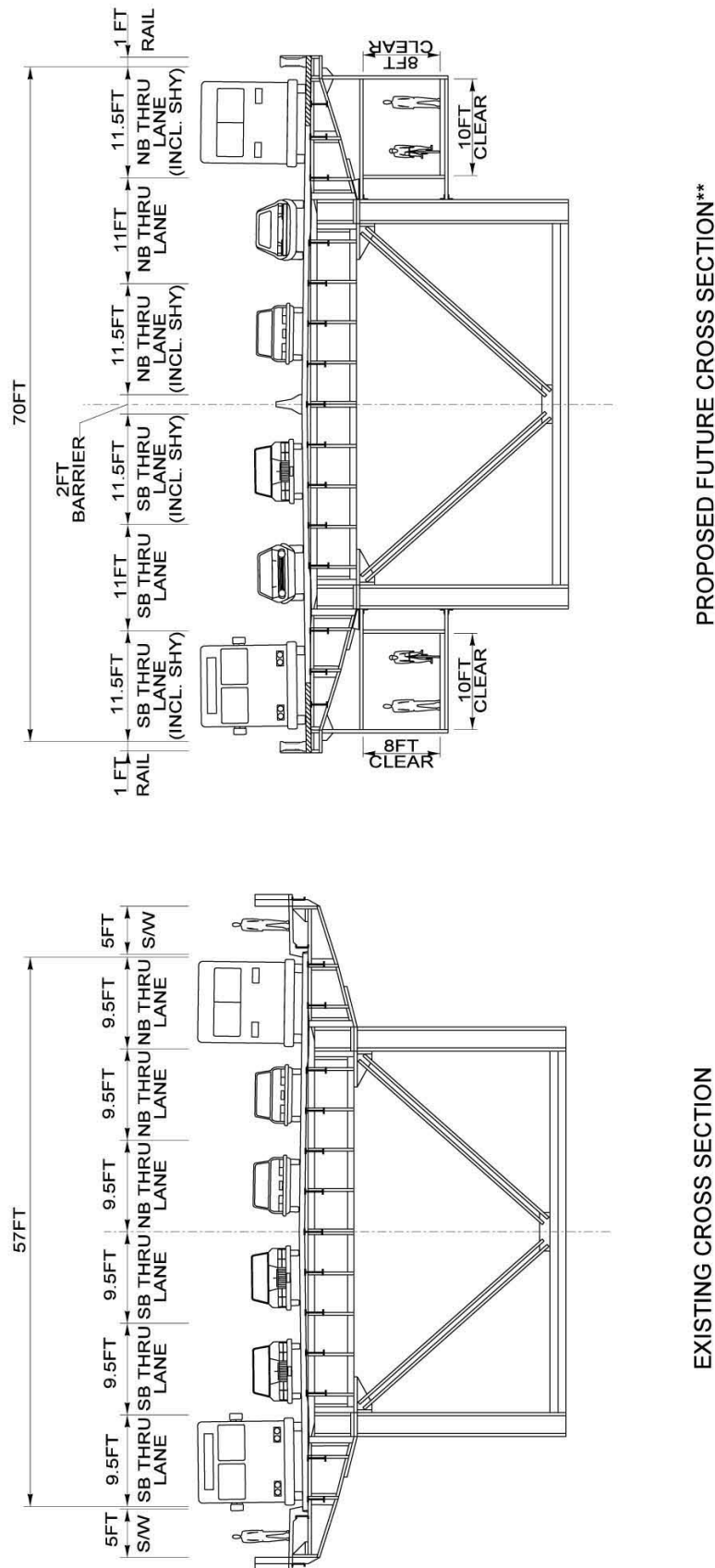


**Picture 6-4:**

**The intersection  
of Bridge Way N.  
and N. 38th Street**

This area of SR 99 North also has a 17-foot outside lane northbound with parking allowed except for the p.m. peak. When parked cars are present, vehicles—especially large vehicles—often merge from the narrowed curb lane into the center lane to avoid the parked vehicles.

Figure 6-6  
Aurora Bridge Future Cross Section





## Options Considered

The N. 38th Street improvements encompass N. 38th Street, SR 99 North as well as Bridge Way N. and Fremont Way N. Two improvements are proposed for this area: intersection improvements and access improvements to SR 99 North. Other options that were considered included a new interchange at N. 38th Street, and access improvements at N. 39th and N. 40th streets. All of the options considered would maintain pedestrian access and existing transit priority. The new interchange was not recommended because it was prohibitively expensive. The access improvements at N. 39th and N. 40th streets were not recommended because of their potential for increasing traffic through residential neighborhoods with narrow lanes.

## Recommendation

Signalization and/or channelization improvements are recommended to the SR 99 North on- and off-ramps on Bridge Way and Fremont Way and their intersections with N. 38th Street, as well as one block of N. 38th Street east of SR 99 North (see Figure 6-7) to improve access and reduce congestion. The City of Seattle has committed to the long-term signalization and channelization improvements at this location and will determine the specifics at a future date. The future improvements will maintain safe pedestrian crossings of Bridge Way, N. 38th Street, and Fremont Way, as well as transit priority and freight access.

In order to improve freight access to northbound SR 99 North from the N. 38th Street area (Figure 6-8), the RDP recommends converting the block of the N. 38th Street immediately to the east of SR 99 North to one-way westbound with a no parking restriction. By restricting parking and converting the street to one-way, enough width would be provided to accommodate the turning movement requirements of large trucks and other large vehicles that would like to travel northbound onto SR 99 North from N. 38th Street area. This set of improvements is recommended for implementation in the near term.

In conjunction with private redevelopment, additional freight access can be provided by adding a new acceleration and deceleration lane northbound between N. 38th and 39th streets (See Figure 6-8).

The estimated cost for all of these improvements is \$1.8 million. The cost estimate is in 2002 dollars.